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Editorial

Cell biology, biophysics, and mechanobiology: From the basics to Clinics

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Cell biology, biomechanics and biophysics are the key subjects that guide our understanding in diverse areas of tissue growth, development, remodeling and homeostasis. Novel discoveries such as molecular mechanism, and mechanobiological mechanism in cell biology, biomechanics and biophysics play essential roles in our understanding of the pathogenesis of various human diseases, as well as in designing the treatment of these diseases. In addition, studies in these areas will also facilitate early diagnostics of human diseases, such as cardiovascular diseases and cancer. In this special issue, we collected 10 original research articles and 1 review.

In these original research articles, Dr, Han Bao, et al., suggested that platelet-derived miR-142-3p is delivered into endothelial cells via platelet-derived microparticles (PMPs), and may modulate the expression of target molecule-BCL2L1, which may subsequently display a negative function by modulating EC apoptosis in hypertension. Dr. Pingping Ma, et al., investigated the mechanism of tumor cells preferentially arrest and adhere to endothelial cells of target organ, and demonstrated that matrix rigidity, endothelial cells and SDF-1 significantly contributed to the organ-specific metastasis of tumor cells, which might contribute to a rational development of innovative anti-cancer drugs.

Dr. Lin Zhang et al., quantified the adhesion of MDA-MB-231 tumor cells on endothelial surface glycocalyx (ESG) in the presence and absence of S1P, and in the presence of the matrix metalloproteinase (MMP) inhibitor in post-capillary venules of rat mesentery, and measured the microvessel permeability to albumin. Finally, they confirmed that protecting ESG by S1P inhibits MDA-MB-231 tumor cell adhesion to the microvessel wall, which further strengthen the phenomenon of S1P maintains the integrity of glycocalyx in endothelial cells (1, 2).

Dr. Qinxue Bao, et al., investigated the role of miR-124 in angiotensin II-induced myocardial hypertrophy by using miR-124 mimics or inhibitor, and found that the inhibition of miR-124-associated with endoplasmic reticulum (ER) stress significantly suppressed the angiotensin II-induced myocardial hypertrophy. The further study on the target gene of miR-124 is needed. Dr. Wenchao Wu, et al., found that visfatin induced upregulation of connective tissue growth factor (CTGF) that plays important role in vascular remodeling and atherosclerosis, via a HIF-1α-dependent pathway but not the TGF-β1 pathway. Dr. Junli Li, et al., demonstrated that TRPC1 might play an important role in cardiomyocyte hypertrophy induced by Nampt in an ER stress-dependent way. These studied are helpful to elucidate the mechanism of myocardial hypertrophy.

Dr. Geng Wu, et al., found that electroacupuncture treatment effectively ameliorated neuronal injury and counteracted the aberrant increase of NOX2 levels in the hippocampus of Alzheimer's disease rats, suggesting that electroacupuncture is a potential strategy for the treatment of Alzheimer's disease.

Dr. Maoqiang Li, et al., demonstrated that peptide 11r-vivit stimulates osteoblastogenesis through regulating the expression of nuclear factor of activated T cells cytoplasmic 1 (NFATc1), suggesting the 11r-vivit is a potential drug against osteoporosis. Dr. SQ Wang, et al., demonstrated the effect of Cx43 expression on oxaliplatin cytotoxicity by using colorectal cancer cell lines, suggesting Cx43 is a diagnostic marker for oxaliplatin treatment in colorectal cancer. Dr. Yingping Xiao et al., concluded that *butyricum* may regulate epithelial barrier function through miR-200c, then to be involved in the process of inflammation-associated cancers.

In the review, Dr. Wen Zhang et al., reviewed the potential mechanism of oxidative stress in mediating autophagy in cancer therapy. This might contribute to development of new therapeutic strategies of cancer through targeting on autophagy.

Thus, these investigators contribute basic, translational, and clinical studies as well as review articles that contribute towards understanding the molecular or mechanobiological mechanisms in health and disease, identification of biomarkers for early diagnostics and treatment. Based on the observations, new therapeutic approaches for clinical and rehabilitative purposes might be developed in the future.

Dr. Hongyan Kang (Beihang University, Beijing, China), Dr. Chi Yang (Nantong University, Nantong, China), Dr. Jialiang Liang, (University of Cincinnati, OH, USA) and Dr. Yan Li (University of Wisconsin-Madison, WI, USA) work as guest editor for this special issue.

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